

TECH CENTER 1600/2900

NOV 15 2001

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RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/486,757

DATE: 11/05/2001

TIME: 13:19:33

Input Set : A:\J&J1673seqlist.txt

Output Set: N:\CRF3\11022001\I486757.raw

#13/ K.T.
11-15-01RAW
SEQ
Listing

ENTERED

P.5

3 <110> APPLICANT: Kutchan, Toni
 4 Zenk, Meinhart
 5 Atkins, David
 7 <120> TITLE OF INVENTION: Cytochrome P450 Reductases from Poppy Plants
 9 <130> FILE REFERENCE: J&J 1673
 11 <140> CURRENT APPLICATION NUMBER: US 09/486757
 C--> 12 <141> CURRENT FILING DATE: 2000-07-03 *OK*
 14 <150> PRIOR APPLICATION NUMBER: AU P08872
 15 <151> PRIOR FILING DATE: 1997-08-29
 17 <160> NUMBER OF SEQ ID NOS: 32
 19 <170> SOFTWARE: PatentIn version 3.0
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 22 <211> LENGTH: 10
 23 <212> TYPE: PRT
 24 <213> ORGANISM: Papaver somniferum
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 33 <212> TYPE: PRT
 34 <213> ORGANISM: Papaver somniferum
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 38 1 5 10 15
 40 Glu Lys
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 44 <211> LENGTH: 18
 45 <212> TYPE: PRT
 46 <213> ORGANISM: Papaver somniferum
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 50 1 5 10 15
 52 Glu Lys
 55 <210> SEQ ID NO: 4
 56 <211> LENGTH: 8
 57 <212> TYPE: PRT
 58 <213> ORGANISM: Papaver somniferum
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 62 1 5
 64 <210> SEQ ID NO: 5
 65 <211> LENGTH: 8
 66 <212> TYPE: PRT
 67 <213> ORGANISM: Papaver somniferum
 W--> 68 <400> SEQUENCE: 5 *OK*
 70 Lys Asp Phe Thr Glu Val Ala Lys

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73 <210> SEQ ID NO: 6
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75 <212> TYPE: PRT
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80 1          5          10
82 <210> SEQ ID NO: 7
83 <211> LENGTH: 10
84 <212> TYPE: PRT
85 <213> ORGANISM: Papaver somniferum
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88 Lys Tyr Ala Asp Leu Leu Asn Phe Pro Lys
89 1          5          10
91 <210> SEQ ID NO: 8
92 <211> LENGTH: 9
93 <212> TYPE: PRT
94 <213> ORGANISM: Papaver somniferum
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98 1          5
100 <210> SEQ ID NO: 9
101 <211> LENGTH: 21
102 <212> TYPE: PRT
103 <213> ORGANISM: Papaver somniferum
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110          20
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114 <212> TYPE: DNA
115 <213> ORGANISM: Papaver somniferum
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122 attatgggtt cgaataattt agctaattcg attgaatcga tgtaggaat atcaatagga      180
124 tcagaatata tttctgaccc aattttcatt atggtcacaa ctgtagcttc aatgctgatt      240
126 ggatttggtt tcttcgcatg tatgaaatct tcgtcttctc aatcaaaacc tattgaaact      300
128 tataaaccaa taattgataa agaagaagag gagattgaag ttgatcctgg taaaattaag      360
130 ctactatat tttttggtac tcagactggg actgctgaag gatttgctaa ggcattggca      420
132 gaagaaatta aggcaaagta caagaaagca gttgttaaag tagttgacct ggatgactat      480
134 gcagccgagg atgatcaata tgaagagaaa ttaaagaaag agtctttggt gtttttcatg      540
136 gtagccactt atgggtgatg tgagccaact gacaatgctg cgagatttta caaatgggtc      600
138 actcaggaac atgaaagggg agagtggctt cagcaactaa cttatgggtg ttttggtttg      660
140 ggtaaccgtc aatacgagca tttcaacaag atcgcggtag atgtggatga gcaactcggg      720
142 aaacaaggtg caaagcgcat tgttcaagtg gggctcgggt acgatgatca atgcattgaa      780

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148	gtgattcacg	aaactacggt	cgcggctctg	gatgataaac	acataaatac	tgctaacggc	960
150	gatgttgcat	ttgatattct	ccatccttgc	agaaccattg	ttgctcaaca	aagagagctc	1020
152	cacaaaccca	agtctgatag	atcctgtata	catctggagt	tcgacataac	aggctcttcc	1080
154	cttacatatg	agactggaga	tcatgtttgt	gtttatgctg	agaactgcga	tgaaactgtc	1140
156	gaggaagcag	ggaagctgtt	gggtcaaccc	ctggatttgc	tgttttcaat	tcacacggat	1200
158	aaagaagacg	ggtcacccca	gggaagctca	ttaccacctc	ctttcccagg	tccttgcacc	1260
160	ttacgatctg	ccctagcacg	ctatgtctgat	cttttgaatc	ctcctagaaa	ggcttctctg	1320
162	attgctctgt	ccgctcatgc	atctgtaccc	agtgaagcag	agagattgcg	ctttttgtca	1380
164	tcacctctgg	gaaagaatga	gtattcaaaa	tgggtagtgt	gaagtcagag	gagtcctttg	1440
166	gagatcatgg	ccgagtttcc	atcagcaaaa	ccccctcttg	gtgtgttctt	tgctgcagta	1500
168	gccccctcgt	taccgcctcg	atactattct	atctcactct	ctcctaagtt	tgctccctca	1560
170	agaattcatg	tgacgtgtgc	tttagtatat	ggtcaaagcc	ctaccggaag	ggttcaccga	1620
172	ggagtgtgtt	cgacatggat	gaagcatgca	gttcctcagg	atagctgggc	tcctattttt	1680
174	gttcgaacgt	caaacttcaa	gttaccagct	gacccctcaa	ctccaattat	catgggtggga	1740
176	cctggtacag	ggtagctcc	tttcagagga	tttctgcagg	aaagaatggc	cctcaaggaa	1800
178	aatggtgctc	aacttggccc	agcagtgtct	tttttcggat	gtaggaatcg	taatatggac	1860
180	ttcatttatg	aagacgaact	aaacaacttc	gtggaacgag	gagtcatttc	ggagctagtt	1920
182	attgcctttt	cacgtgaagg	ggaaaagaag	gaatatgttc	aacataagat	gatggagaaa	1980
184	gcaacggatg	tatggaatgt	gatatcaggg	gacggttatc	tctatgtgtg	tggtgatgcc	2040
186	aagggaatgg	ccagagatgt	ccatgcgacg	ttgcatacca	ttgccaaga	acagggaccc	2100
188	atggaatcat	ctgctgccga	agctgcagta	aagaaactcc	aagttgaaga	acgatattcta	2160
190	agagatgtct	ggtgatcgaa	tgtagcttgc	caagtcacct	tttcttggct	ggtctgttta	2220
192	tggtttctat	tatattattg	atcctcctct	gaaaatccca	agcacttcca	gacatccctc	2280
194	gattcttctt	ccagtgggtc	caaatcgaa	ctcgggtata	ttgagagcag	tgcaattgtg	2340
196	actacatgag	aagcaaacat	cgaataccat	agaattagaa	agatcaaaat	tctcttatca	2400
198	gaacaatgtt	acaggcaaaa	ctgtgtttgc	ttaatataaa	tttcacacca	tgggtgtgga	2460
200	caacactgaa	acagtattag	ctataccaac	aaagttatgc	aaggaaacac	aaactagtta	2520
202	gatcttctct	ttggattgat	tactgtaagt	tctaaccaga	tgatagattg	tacttaaaga	2580
204	ttcttgtttt	cttatggcta	ccgagaggag	tatattaatg	catttagagt	tttgagaaaa	2640
206	aaaaaaaa						2649

209 <210> SEQ ID NO: 11

210 <211> LENGTH: 2558

211 <212> TYPE: DNA

212 <213> ORGANISM: Eschscholzia californica

W--> 213 <400> SEQUENCE: 11

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218	tcagaaacac	tgaagctcat	catcatcctt	gaaacttata	gtctttgttt	gaccttttga	120
220	aaaactatgg	aacaaactgc	ggttaaagtc	tctttgtttg	atctattttc	ttcgatactt	180
222	aatggaaagt	tggatccgtc	gaacttttct	tcagattcaa	gtgctgctat	tttgattgaa	240
224	aatcgtgaga	ttttaatgat	cttaacaact	gctattgctg	tttttatcgg	ttgtggtttt	300
226	ctctacgttt	ggagaagatc	ttcaaataag	tcgagtaaaa	ttgttgaaac	tcagaaattg	360
228	atcgttgaaa	aggaaccaga	acctgaagtt	gatgatggaa	agaagaaggt	tactatcttc	420
230	tttggtactc	aaactggtac	agctgaagga	ttcgcaaagg	cacttgctga	agaagcaaaa	480
232	gcaagatatg	aaaaggcaat	ctttaaagtg	attgatctgg	atgattacgg	agcagatgat	540
234	gatgaattcg	aagagaaatt	gaaaaaggaa	actatagctc	ttttcttttt	ggctacctat	600
236	ggagatggtg	aacctacaga	taatgctgca	agattttata	aatggttcac	agaggggaga	660
238	gagggaaatg	tggctccaga	atcttcaatt	tgggtgtctc	ggtctaggca	atagacagta	720

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240 tgagcatttc aataagggtgg caaaggaggt ggaagagata ctactgaac aggggtgggaa 780
242 gcgtattgtt cccgtgggtc taggagatga tgatcaatgc atagaagatg atttcactgc 840
244 gtggcgggag ttggtatggc ctgaattgga tcagttgctc cttgatgaaa gtgataaaac 900
246 atctgtttct actccttaca ctgccatcgt accagaatac agggtagtat tccatgatgc 960
248 tactgatgca tcaactacaag acaaaaaactg gagcaatgca aatggctaca ctgtttacga 1020
250 cgttcaacac ccatgcagag ccaatgtcgt tgtaaagaag gagcttcaca ctccagtatc 1080
252 tgatcggtct tgtattcatc tgggaatttga catttctggc actgggctca cgtatgaaac 1140
254 aggagaccat gtccgtgttt actctgagaa ttgtgttgaa gttgtcgagg aagcagagag 1200
256 gctattgggt tactcatcag acaccgtttt ttcaatccat gtcgataaag aggacggctc 1260
258 acccattagt ggaagcgcct tagctcctcc tttccaact ccctgcactc taagaacagc 1320
260 actaacacga tacgctgate tgttgaattc tccaagaag gctgctctgc atgctttggc 1380
262 tgcttatgca tccgatccaa aggaagcggg gcgactaagg tatcttgctg ctccgtctgg 1440
264 gaaggacgaa tacgccaggt ggatagtagc tagtcagaga agtctgctag tggtcatggc 1500
266 tgaattccca tcagcaaagg ctccaattgg ggttttcttt gcagcagtag ctccctcgctt 1560
268 gctgccaaaga tactattcta tttcatcttc caataggatg gtaccatcta ggattcatgt 1620
270 cacatgtgca ttggtgcatg aaaaaacacc ggcaggctcg gttcacaag gagtgtgttc 1680
272 aacctggatg aagaattctg tgtctttgga agaaaacccat gattgcagca gctgggcacc 1740
274 aatctttgtc aggcaatcca acttcaaac tctgctgat tctacagtac caattataat 1800
276 gattggctct gggactggat tagctccctt taggggattc atgcaggagc gattagctct 1860
278 gaagaattct ggtgtagaat tgggacccgc tatctcttct tttggatgca gaaacagaca 1920
280 gatggattac atatatgaag aggagctaaa caactttgtg aaagaggag ctatctccga 1980
282 agttgttgtt gottttctac gtgagggagc taccaaggaa tacgtacaac ataaaatggc 2040
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286 tgatgccaag ggcattggct gagacgtaca tcgaactctc cacaccattg cccaggaaca 2160
288 gggatctttg gacaactcga agaccgaaag cttggtgaag aatctacaga tggatggaag 2220
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292 agaacgcgct tgagaagcat aaatcttagt tgcagagatg ttgatttcag aagaaatgct 2340
294 ttatatactt gaggtagcgg acattaatcc ttttctctct ctctaaactg ttaatcctgt 2400
296 aaaaaaggga ttgctgtttg tgtttgctcg caatcaatta agttatatte tttggtctat 2460
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303 <210> SEQ ID NO: 12

304 <211> LENGTH: 2650

305 <212> TYPE: DNA

306 <213> ORGANISM: Papaver somniferum

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314 attatgggtt cgaataattt agctaattcg attgaatcga tgttaggaat atcaatagga 180
316 tcagaatata tttctgacct aattttcatt atggtcacaa ctgtagcttc aatgctgatt 240
318 ggatttggtt tcttcgcatg tatgaaatct tcgtcttctc aatcaaaacc tattgaaact 300
320 tataaaccaa taattgataa agaagaagag gagattgaag ttgatcctgg taaaattaag 360
322 ctactatat tttttggtac tcagactggg actgctgaag gatttgctaa ggcattggca 420
324 gaagaaatta aggc aaagta caagaaagca gttgttaaag tagttgacct ggatgactat 480
326 gcagccgagg atgatcaata tgaagagaaa ttaaagaaag agtctttggt gtttttcatg 540
328 gtagccactt atggtgatgg tgagccaaact gacaatgctg cgagatttta caaatggttc 600
330 actcaggaac atgaaagggg agagtggctt cagcaactaa cttatggtgt ttttggtttg 660
332 ggtaacccgtc aatacgagca tttcaacaag atcgcggtag atgtggatga gcaactcggg 720
334 aaacaagggtg caaagcgcgt tgttcaagtg gggctcgggt acgatgatca atgcattgaa 780

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338 gaggatgctg ctccctcagt ggctacaccg tatattgcta ctgttcctga atacagggta 900
340 gtgattcacg aaactacggt cgcggctctg gatgataaac acataaatac tgctaacggc 960
342 gatgttgcac ttgatattct ccacccctgc agaaccattg ttgctcaaca aagagagctc 1020
344 cacaacacca agtctgatag atcctgtata catctggagt tcgacataac aggcctcttc 1080
346 cttacatatg agactggaga tcatgttggg gtttatgctg agaactgcga tgaaactgtc 1140
348 gaggaagcag ggaagctgtt gggcaacccc ctggatttgc tgttttcaat tcacacggat 1200
350 aaagaagacg ggtcacccca ggaagctca ttaccacctc ctttcccagg tccttgcacc 1260
352 ttacgatctg ccctagcacg ctatgctgat cttttgaatc ctcctagaaa ggcttctctg 1320
354 attgctctgt ccgctcatgc atctgtaccc agtgaagcag agagattgcg ctttttgtca 1380
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358 gagatcatgg ccgagtttcc atcagcaaaa cccctcttgc gtgttttctt tgctgcagta 1500
360 gcccctcgct taccgctcg atactattct atctcactct ctcctaagtt tgctccctca 1560
362 agaattcatg tgacgtgtgc tttagtatat ggtcaaagcc ctaccggaag ggttcaccga 1620
364 ggagtgtgtt cgacatggat gaagcatgca gttcctcagg atagctgggc tcctattttt 1680
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368 cctggtacag ggttagctcc tttcagagga tttctgcagg aaagaatggc cctcaaggaa 1800
370 aatggtgctc aacttggccc agcagtgtc ttttctggat gtaggaatcg taatatggac 1860
372 ttcatttatg aagacgaact aaacaacttc gtggaacgag gagtaatttc ggagctagtt 1920
374 attgcctttt cactgaagg ggaagaag gaatatgttc aacataagat gatggagaaa 1980
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380 atggaatcat ctgctgccga agctgcagta aagaaactcc aagttgaaga acgatattca 2160
382 agagatgtct ggtgatcgaa tgtagcttgc caagtcctct tttcttggct ggtctgttta 2220
384 tggtttctat tatattattg atcctcctct gaaaatccca agcacttcca gacatccctc 2280
386 gattcttctc ccagtgttcc caaatcgaag ctcggtataa ttgagagcag tgcaattgtg 2340
388 actacatgag aagcaaacat cgaataccat agaattagaa agatcaaaat tctcttatca 2400
390 gaacaatgtt acaggcaaaa ctgtgtttgc ttaatatataa tttcacacca tgggtgtgga 2460
392 caacactgaa acagtattag ctataccaac aaagttatgc aaggaaacac aaactagtta 2520
394 gatcttctct ttggattgat tactgtaagt tctaaccaga tgatagattg tacttaaaga 2580
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398 aaaaaaaaaa 2650

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401 <210> SEQ ID NO: 13

402 <211> LENGTH: 683

403 <212> TYPE: PRT

404 <213> ORGANISM: Papaver somniferum

W--> 405 <400> SEQUENCE: 13

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412 20 25 30
414 Thr Val Ala Ser Met Leu Ile Gly Phe Gly Phe Phe Ala Cys Met Lys
415 35 40 45
417 Ser Ser Ser Ser Gln Ser Lys Pro Ile Glu Thr Tyr Lys Pro Ile Ile
418 50 55 60
420 Asp Lys Glu Glu Glu Glu Ile Glu Val Asp Pro Gly Lys Ile Lys Leu
421 65 70 75 80
423 Thr Ile Phe Phe Gly Thr Gln Thr Gly Thr Ala Glu Gly Phe Ala Lys
424 85 90 95

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Use of n and / or Xaa has been detected in the Sequence Listing. Review the Sequence Listing to ensure a corresponding explanation is present in the <220> to <223> fields of each sequence using n or Xaa.

Use of n and / or Xaa has been detected in the Sequence Listing. Review the Sequence Listing to ensure a corresponding explanation is present in the <220> to <223> fields of each sequence using n or Xaa.

VERIFICATION SUMMARY

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L:35 M:283 W: Missing Blank Line separator, <400> field identifier
L:47 M:283 W: Missing Blank Line separator, <400> field identifier
L:59 M:283 W: Missing Blank Line separator, <400> field identifier
L:68 M:283 W: Missing Blank Line separator, <400> field identifier
L:77 M:283 W: Missing Blank Line separator, <400> field identifier
L:86 M:283 W: Missing Blank Line separator, <400> field identifier
L:95 M:283 W: Missing Blank Line separator, <400> field identifier
L:104 M:283 W: Missing Blank Line separator, <400> field identifier
L:116 M:283 W: Missing Blank Line separator, <400> field identifier
L:213 M:283 W: Missing Blank Line separator, <400> field identifier
L:307 M:283 W: Missing Blank Line separator, <400> field identifier
L:405 M:283 W: Missing Blank Line separator, <400> field identifier
L:542 M:283 W: Missing Blank Line separator, <400> field identifier
L:636 M:283 W: Missing Blank Line separator, <400> field identifier
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L:853 M:283 W: Missing Blank Line separator, <400> field identifier
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L:1875 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:28
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L:2031 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:32